To: Laidlaw, Tina[Laidlaw.Tina@epa.gov]
From: Suplee, Mike
Sent: Tue 5/13/2014 8:26:35 PM
Final.docx

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Hi Tina;

Attached is the project description for the lagoon BMP project.

-Mike

ATTACHMENT A

SCOPE OF WORK

BACKGROUND

New ammonia criteria for the protection of aquatic life have been released (EPA, 2013) and they are more stringent than those in Department Circular DEQ-7 (DEQ, 2012). In the future, at pH 7.0, the chronic ammonia criterion may be 1.9 mg N/L; currently it is 4.2 mg N/L.

Concurrently, the Board of Environmental Review is considering adoption of numeric nutrient standards for total nitrogen (TN) and total phosphorus (TP) in surface waters. Concentrations range from 25 to 150 µg TP/L and 275 to 1,300 µg TN/L. While a variance process will be adopted along with the numeric nutrient criteria, allowing for gradual achievement of the standards, no such process exists for ammonia. These proposed changes in surface water standards would increase the demands on all wastewater facility operators. Facultative lagoons operators are no exception. However, facultative lagoons were not designed for highly-efficient removal of ammonia and nutrients. Optimization of lagoons for ammonia and total-nutrients removal, as well as Best Management Practices (BMPs) for the same purpose, are topics DEQ wants to thoroughly investigate.

GENERAL APPROACH

We would like a review of the technical literature regarding optimization methods and BMPs available for reducing ammonia, TN, and TP concentrations in facultative lagoon discharges. The primary scientific and engineering literature must be consulted, as well as the 'gray' literature which is likely to contain studies and technical reports describing the application of lagoon optimization methods and BMPs. Emerging, innovative technologies must be considered along with more-established approaches. Examples include floating treatment wetlands (e.g., Yang and Mei Sun, 2008; White and Cousins, 2013), rock filters, lagoon covers, advanced integrated pond systems, recirculation, fixed media systems, fill and draw operational schemes, bacterial-augmentation approaches, and algae bioreactors.

We are most interested in approaches that will allow a lagoon facility to reduce ammonia immediately and also reduce TN and TP, or at a minimum address ammonia and position the lagoon facility so that it can address TN and TP in the future. Lagoon optimization approaches that only address ammonia and do not allow for addressing TN and TP reduction are not the main objective of this study.

SERVICES

The contractor will be tasked with identifying all potential approaches—be they fully developed or still in testing—for reducing ammonia and total nutrients from lagoons without upgrading the lagoon to a major mechanical facility. However, we want much more than a compendium of available methods. Based on their findings, the contractor will recommend the best or most promising methods for use in Montana (given our climate, period when the ammonia and nutrient standards apply, etc.), and why. We hope to implement the methods on the ground as case-studies in cooperation with several communities around Montana in the near future.

DELIVERABLES

The outcome will be a completed technical report. The report will document the resources consulted, discuss the best optimization methods and BMPs available for the purpose of reducing ammonia, TN, and TP in Montana facultative lagoons, and will recommend which approach (or approaches) are most promising for Montana and, specifically, why. Project must be completed by December 13, 2014.

REFERENCES

EPA (U.S. Environmental Protection Agency), 2013. Aquatic life ambient water quality criteria for ammonia – freshwater. Office of Water, Document No. EPA 822-R-13-001.

DEQ, 2012. Department Circular DEQ-7, Montana Numeric Water Quality Standards. October 2012 Edition. Available at http://deq.mt.gov/wqinfo/Standards/default.mcpx

White, S.A., and M.M. Cousins, 2013. Floating Treatment Wetland Aided Remediation of Nitrogen and Phosphorus from Simulated Stormwater Runoff. Ecological Engineering 61: 207-215.

Yang, Z., and J.C. Mei Sun, 2008. Purification of Nitrate-rich Agricultural Runoff by a Hydroponic System. Bioresource Technology 99: 8049-8053.